

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants: Ohira, et al.)
) Group Art Unit: 1762
Serial No.: 09/924,826)
)
Filed: August 8, 2001) Examiner: Fuller
)
For: METHOD OF ENERGY CONVERSION)

Assistant Commissioner for Patents
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REPLY BRIEF

I. STATUS OF THE CLAIMS

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-36 are pending in the application. Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-36 stand finally rejected.

II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-35 stand rejected under 35 U.S.C. 112, first paragraph.

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-35 stand rejected under 35 U.S.C. 112, second paragraph.

Claims 1, 2, 6, 8, 12, 14, 17-22, 25-27, 29-31 and 33-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over United States Patent No. 5,439,512 to Kamijima et al (Kamijima).

Claims 1-3, 6, 8-12, 14, 17-19, 21, 22, 25-27, 29-31, and 33-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over United States Patent No. 4,430,466 to Cooper (Cooper) in view of United States Patent No. 5,858,521 to Okuda et al. (Okuda).

Claim 24 is rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Cooper in view of Okuda and further in view of United States Patent No. 4,602,054 to Kang et al. (Kang).

Claim 28 is rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Cooper in view of Okuda and further in view of United States Patent No. 4,218,349 to Minatono et al. (Minatono).

Claims 1-3, 6, 8-12, 14, 17-19, 21, 22, 25-27, 29-31, and 33-35 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Okuda.

Claim 24 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Okuda in view of Kang.

Claim 28 is rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Okuda in view of Minatono.

III. ARGUMENT

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-35 comply with the written description requirement. In the Examiner's Answer, the Examiner has asserted that there is inadequate written description for energy conversion sheets having a thickness of 1 millimeter or greater. Specifically, the Examiner asserts that the description does not have support for the entire range of 1 mm or greater (Examiner's Response, page 3). Appellants respectfully disagree.

MPEP 2111 provides that the broadest reasonable interpretation of the claims must be consistent with the interpretation that those skilled in the art would reach. *In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999) (The Board's construction of the claim limitation "restore hair growth" as requiring the hair to be returned to its original state was held to be an incorrect interpretation of the limitation. The court held that, consistent with applicant's disclosure and the disclosure of three patents from analogous arts using the same phrase to require only some increase in hair growth, one of ordinary skill would construe "restore hair growth" to mean that the claimed method increases the amount of hair grown on the scalp, but does not necessarily produce a full head of hair).

Moreover, MPEP 2163.02 provides that an objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed." *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989).

Furthermore, in order to determine whether an application meets the "written description" requirement with respect to later-filed claims, the application needs not describe the claimed subject matter in exactly the same terms as used in the claims, *In re Lukach*, 442 F.2d 967, 969, 169 U.S.P.Q. 795 (C.C.P.A. 1971). It must simply indicate to those of ordinary skill in the art that as of the filing date the applicant had invented what is now claimed. *Id.*, at 1563, 19 U.S.P.Q.2d at 1116; see *In re Wertheim*, 541 F.2d 257, 191 U.S.P.Q. 90, (C.C.P.A. 1976).

The instant written description clearly allows persons of ordinary skill in the art to recognize that Appellants invented the claimed energy conversion sheets having a thickness of 1 mm or greater. As discussed above, the question is not whether the description is literally there; the question rather is what is conveyed to one having ordinary skill in the art reading the specification. One of ordinary skill in the art reading the instant description in light of the functions and properties of the disclosed sheets would naturally envision sheets of 1 mm or

greater. First, by way of examples, the instant description as originally filed adequately describes various embodiments of energy conversion sheets of 1 mm or greater that have excellent impact absorption capabilities. In particular, sheets of 1 mm thick (Embodiment 28), 3 mm thick (Embodiment 29), 5 mm thick (Embodiment 30), and 10 mm thick (Embodiment 31) are described at least at lines 13-16 of page 94.

Second, the Figures further demonstrate that the Appellants invented energy conversion sheets having thicknesses of 1 mm or greater. Specifically, Figures 5 and 49 show energy conversion sheets of 1 mm or greater with excellent impact absorption capabilities. Figure 5 shows that an energy conversion sheet having thickness of 1 mm has improved damping capability (lines 3-10 of page 79; lines 14-21 of page 80). Figure 49 demonstrates that all energy conversion sheets of 3 to 10 mm thickness (Embodiments 29-31) have improved damping capabilities (lines 13-16 of page 94; lines 3-21 of page 95). Figure 49 further shows that damping capability increased from Embodiment 29 (3 mm) to Embodiment 31 (10 mm) where the thickness increases in this order. Moreover, Embodiment 31 with a thickness of 10 mm exhibited an excellent damping property of 52 to 53. Thus, one of ordinary skill in the art would understand that sheets of greater than 10 mm would equally, or indeed perhaps more effectively, improve the damping capabilities given the above detailed description and the state of the art. In addition, the person of ordinary skill in the art would realize that the Appellants was in possession of the energy conversion sheets of 1 mm or greater even though no specific examples of sheets of greater than 10 mm were literally given.

Accordingly, there is adequate support for sheets having a thickness of 1 mm or greater.

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-35 are not indefinite as one of ordinary skill in the art would understand the metes and bounds of the instant claims when they are read in light of the specification. The Examiner asserts that the scopes of the instant claims are confusing because “the claims read on the material being a sheet, fiber, or combination thereof and then further limits that the sheet has a minimum thickness” (Examiner’s Response, page 3). Appellants respectfully disagree. There is no confusion as to the scopes of the instant claims and one of ordinary skill in the art would understand the metes and bounds of the claims.

Appellants respectfully submit that the proper standard for indefiniteness is whether one of ordinary skill in the art would understand what is claimed when the claim is read in light of

the specification. *Seattle Box Co. v. Industrial Crating and Packing, Inc.*, 731 F.2d 818, 826, 221 U.S.P.Q. 568, 573-574 (Fed. Cir. 1984).

There is no confusion as to the scopes of the instant claims. Claim 1 requires that, among other things, “wherein said energy conversion material is in the form of a sheet, fiber or combination thereof and the sheet has a thickness of 1 millimeter or greater”. Thus, Claim 1 specifically limits the energy conversion material to be “in the form of a sheet, fiber or combination thereof”. If the energy conversion material is in the form of a sheet, then Claim 1 further requires that “the sheet has a thickness of 1 mm or greater”. If, on the other hand, the material is not in the form of a sheet, for example a fiber, then there is no particular limit as to its thickness or size. One of ordinary skill in the art would clearly understand the metes and bounds of Claim 1 regarding the form and thickness of the energy conversion material.

The Examiner, however, asserts that “the scopes of the claims are confusing because this is a broad range or limitation written with a narrow range or limitation that falls within the broad range or limitation (in the same claim) (Examiner’s Response, page 3). The Examiner further asserts that the requirement that “the sheet has a thickness of 1 mm” requires that “the material must have a sheet aspect to it (not a fiber) and is the narrower requirement than the previous limitation” (Examiner’s Response, page 4). Appellants respectfully point out that this is an incorrect reading of the claims. The limitations on the form of the energy conversion material and the thickness the sheet are not narrow range (or limitation) within a broad range (or limitation) in the same claim. Rather, they are different limitations on two distinct properties of the material – the form of the material (a sheet, fiber or combination thereof) and the thickness of one of the forms (the sheet has a thickness of 1 millimeter or greater). Accordingly, Claim 1 and its dependent claims are not indefinite as there would be no confusion as to the scope of the claims and one of ordinary skill in the art would understand the metes and bounds of the claims.

The Examiner also cited MPEP2173.05(c) and *Ex Parte Wu* to support the above positions and asserts that where broad language is followed by “such as” and then narrow language then claim may be indefinite (Examiner’s Response, page 4). Appellants respectfully point out that the instant claims do not use such language.

Claims 1, 2, 6, 8, 12, 14, 17-22, 25-27, 29-31 and 33-36 are unobvious in view of United States Patent No. 5,439,512 to Kamijima et al (Kamijima).

Kamijima teaches a composition of an anti-fouling paint that uses acrylic rubber with

DCHBSA. The paint of Kamijima results in a coating having a thickness of 50 micrometers (Col. 20, line 34) to 100 micrometers (Col. 23, line 16). As stated by the Examiner, Kamijima fails to teach the claimed thickness of the paint (Examiner's Response, page 5).

The Examiner has asserted that the paint reads on the instantly claimed sheet because once the paint is applied, particularly on a broad surface, it becomes a sheet. In making the obviousness rejection the Examiner has stated "to determine the thickness required such that sufficient anti-fouling property is supplied to the hull and reapplication is required least often would have been obvious at the time the invention was made to a person having ordinary skill in the art through routine experimentation" (Examiner's Response, page 5).

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Instant claims are not obvious over Kamijima. Firstly, Kamijima does not disclose the claimed thickness and hence a prima facie case of obviousness has not been made. Additionally, the Examiner has asserted that the claimed thickness would be obvious in order to reduce reapplication of the paint. However, Kamijima fails to provide any suggestion to increase the thickness of the anti-fouling coating paint, let alone by ten fold. Indeed, a thicker paint in Kamijima would not necessarily resist barnacle growth better than a thinner paint as the inhibitory effect of the paint on barnacle growth is likely the result of a surface property that would be unaffected by thickness. Moreover, increasing paint thickness when applied to the hull of a boat increases drag and hence decreases performance – particularly speed and fuel economy. Thus, a person of ordinary skill in the art would not be motivated to increase the thickness of the anti-fouling paint of Kamijima.

Even assuming, *arguendo*, that one were to increase the thickness of the anti-fouling paint, there would be no reasonable expectation of success. The Examiner is asserting that increasing the thickness of Kamijima by ten fold or more is "routine experimentation".

Appellants respectfully assert that there is no support for this assertion as thicker does not necessarily translate to better properties with regard to paint, particularly marine paint. Furthermore, there is no support that a thicker paint would adhere to the hull of a boat better than a thinner paint and hence reduce the need for reapplication.

Accordingly, instant claims are not obvious over Kamijima as this reference fails to teach or suggest the particular sheet thickness of the instant claims.

Claims 1-3, 6, 8-12, 14, 17-19, 21, 22, 25-27, 29-31, and 33-36 are unobvious in view of Cooper in combination with Okuda. Claim 24 is unobvious in view of Cooper in combination with Okuda and Kang. Claim 28 is unobvious in view of Cooper in combination with Okuda and Minatono.

Claims 1-3, 6, 8-12, 14, 17-19, 21, 22, 25-27, 29-31, and 33-35 are unobvious in view of Okuda. Claim 24 is unobvious in view of Okuda and Kang. Claim 28 is unobvious in view of Okuda and Minatono.

Cooper discloses a sulfur curable conjugate diene rubber compound formulation containing a silica reinforcing filler and a coupling agent and a benzothiazyl sulfenamide accelerator. (Abstract) As stated by the Examiner Cooper fails to teach the claimed amount of N, N- dicyclohexylbenzothiazyl-2-sulfonamide (DCHBSA) in the composition (Examiner's Response, page 6).

The Examiner has cited Okuda for its teaching with regard to how the degree of vulcanization affects the physical properties of the rubber and how vulcanization is controlled. The Examiner has asserted that Okuda teaches modifying the amount of vulcanizing agents which includes modifying the amount of vulcanizing accelerators. The Examiner has further asserted that "It would have been obvious ... to determine the amount of vulcanizing agents and accelerators in the composition such that the desired degree of vulcanization is achieved. By doing so the vibration dampening property of the tire is maximized" (Examiner's Response, page 6).

Appellants respectfully point out that, contrary to the Examiner's statement, Okuda fails to teach or suggest the claimed amount of DCHBSA of 10 to 500 parts by weight. The only teaching in Okuda with regard to the amount of vulcanization accelerator can be found in the table in Col. 14, line 37. The table teaches 5 parts by weight of vulcanization accelerator, which

is half of the claimed amount.

Additionally, Okuda also fails to teach or suggest that desired degree of vulcanization can be achieved by varying the amount of vulcanizing accelerators. Okuda discusses, in Column 5, lines 10-35, the desired rubber viscosity of the viscoelastic layer composition before vulcanization and the modulus of dynamic shearing elasticity after vulcanization. Specifically, Okuda teaches that “the modulus of dynamic shearing elasticity and the rubber hardness before and after vulcanization can be appropriately adjusted by the types and the added amounts of the above-mentioned vulcanizing agents, softening agents and fillers” (emphasis added, Col. 5, lines 31-35). Okuda, at Col. 3, lines 21-39, makes a distinction between vulcanization agents such as sulfur and peroxides and vulcanization accelerators such as N-cyclohexyl-2-benzothiazolyl sulfenamide. A person of ordinary skill in the art would understand that vulcanization agents and vulcanization accelerators have different properties and serve different functions in the vulcanization process. Vulcanization accelerators affect the curing time but not the amount of cure. In contrast, the amount of cure is dependent upon the amount of vulcanization agent. A vulcanization accelerator can reasonably be compared to a catalyst which decreases the reaction time of a chemical reaction but does not alter the thermodynamic equilibrium of the reaction (e.g., how much product is formed). As benzothiazyl sulfenamide compounds such as DCHBSA are vulcanization accelerators, not vulcanization agents, Okuda does not teach or suggest modification of the amount of vulcanization accelerators, let alone the particular amount of DCHBSA of 10 to 500 parts by weight, to attain particular physical properties.

The Examiner asserts that Okuda teaches that the degree of vulcanization affects the vibration dampening properties of the rubber and is controlled by vulcanizing agents and vulcanizing accelerators (Examiner’s Response, page 6). For reasons presented above, Appellants respectfully disagree. Additionally, even assuming *arguendo* the accuracy of the Examiner’s position regarding Okuda’s teachings, such a general teaching would not provide suggestion or motivation to a person of ordinary skill in the art to use the particular amount of the vulcanizing accelerators (10 to 500 parts by weight) of the instant claims. Moreover, there would be no reasonable expectation of success of arriving at the instant claims. From Okuda (5 parts by weight) to the instant claims (10 to 500 parts by weight), one would need to increase the amount of the vulcanizing accelerator. More vulcanizing accelerator would result in more vulcanization. Since vulcanization results in chemical bonds being formed between polymer

chains and more chemical bonds between polymer chains (cross links) mean more rigidity, increased rigidity from more vulcanizing accelerators would actually decrease the vibration dampening property of the hypothetical tire. Thus, there would be no reasonable expectation of success even assuming the accuracy of the Examiner's assertion regarding Okuda's teaching.

Kang and Minatono have been cited to provide specific elements of Claims 24 and 28 and do not rectify the combined deficiencies of Cooper and Okuda or the deficiencies of Okuda alone.

Accordingly, instant claims are not obvious over Cooper in view of Okuda, further in view of Kang and Minatono, as these references, either alone or in combination, fail to teach or suggest the claimed amount of 10 to 500 parts by weight of the vulcanization accelerators.

In summary, the pending claims are non-obvious over the cited art. For the reasons presented above, Appellants respectfully submit that all of the claims are allowable and the application is in condition for allowance. Appellants respectfully request reversal of the outstanding rejections and allowance of this application.

In the event the Examiner has any queries regarding the submitted arguments, the undersigned respectfully requests the courtesy of a telephone conference to discuss any matters in need of attention.

If there are any additional charges with respect to this Reply Brief, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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